# A SYSTEM FOR RECORDING WORLD WIDE WEB BROWSING SESSIONS NAVIGATION ON A REAL-TIME BASIS AND FOR SUBSEQUENTLY DISPLAYING THE RECORDED SESSIONS AS SURROGATE BROWSING SESSIONS WITH USER ENABLED REAL-TIME MODIFICATION

5    Cross-Reference to Related Copending Patent Applications

The following patent application is assigned to the assignee of the present invention, filed concurrently herewith and covers subject matter related to the subject matter of the present invention:  A SYSTEM FOR DELAYED

10   VIEWING OF SELECTED DOCUMENTS HYPERLINKED TO HYPERTEXT DOCUMENTS RECEIVED AT A USER INTERACTIVE RECEIVING DISPLAY STATION IN A COMPUTER CONTROLLED COMMUNICATION NETWORK, Cristi N. Ullmann et al., (Attorney Docket No. AUS920010906.US1).  This application is hereby

15   incorporated by reference.


Technical Field

The present invention relates to computer managed communication networks such as the World Wide Web (Web), and particularly to recording of Web browsing sessions

20   for subsequent use, review and analysis.


Background of Related Art

The past decade has been marked by a technological revolution driven by the convergence of the data processing industry with the consumer electronics

25   industry.  The effect has, in turn, driven technologies that have been known and available but relatively quiescent over the years.  A major one of these technologies is the Internet or Web related distribution of documents, media and programs.  The convergence of the

30   electronic entertainment and consumer industries with

data processing exponentially accelerated the demand for wide ranging communication distribution channels, and the Web or Internet, which had quietly existed for over a generation as a loose academic and government data

5 distribution facility, reached "critical mass" and commenced a period of phenomenal expansion. With this expansion, businesses and consumers have direct access to all matter of documents, media and computer programs.

In addition, Hypertext Markup Language (HTML), which

10 had been the documentation language of the Internet or Web for years, offered direct hyperlinks between Web pages embedded in such Web pages. This even further exploded the use of the Internet or Web.

It is now possible for the Web browser or wanderer

15 to spend literally hours going through document after document in often less than productive excursions through the Web. These excursions often strained the users' time and resources. A significant source of this drain is in the Web page itself (the basic document page of the Web).

20 In the case of Web pages, we do not always have the situation of a relatively small group of professional designers working out the human factors; rather, in the era of the Web, anyone and everyone can design a Web page or document. As a result, Web pages are frequently setup

25 and designed in an eclectic manner. Often Web pages or documents are set up through loose business, professional, social and educational configurations with general trade or public input of Web pages. Although many Web pages are professionally designed and, thus,

30 relatively efficient to use, there are still a great many Web pages that are very cumbersome to access and to use, particularly when the user is making in depth searches.

Thus, there are many situations where individuals who could greatly benefit from the vast database resources available through the Web lack the skills and/or the time required to browse the Web in order to
5　search and develop the information that would be of the greatest value to them.

Two examples of such individuals are: 1) leaders and executives in technology, business and academia who chose to devote most of their time and energies to their
10　professions and disciplines, and, thus, have less time to develop their computer and Web browsing skills; and 2) the physically handicapped or impaired. In order for physically impaired people to use the Web, they are required to make almost continual cursor or pointer
15　control movements. One source of frustration to physically and visually impaired computer users has been movement of the screen cursor and like movable screen indicia to make the required user-interactive selections. Despite all of the great changes that have been made in
20　the computer industry, the screen cursor or pointer controlled manually by the user still remains the primary human-computer interface. The user still commands the computer, primarily through manual pointing devices such as mice, joy sticks and trackballs that control the on-
25　screen cursor movements. It must be noted that the principles involved in such pointing devices were developed over a generation ago when most of the people involved in interfaces to computers were computer professionals who were willing to invest great amounts of
30　time in developing computer skills. These cursor control devices translate relatively precise orthogonal manual movements into precise cursor movements on the display screen. Users with poor hand-eye coordination due to

4

poor eyesight, physical impairment, feebleness or other dexterity problems find the computer mouse to be quite stressful and frustrating. Consequently, Web browsing or searching is often impractical.

5　　　Thus, such 1) high end professionals and 2) physically impaired people have others with greater computer skills and dexterity conduct their Web browsing and searching. This delegation of the Web browsing function presents its own set of problems. In the case

10　of the high end executives and professionals, these individuals cannot possibly convey to the searchers the knowledge and skills that these professionals have in their own disciplines. Consequently, the value of the searches are limited by the searcher's limited knowledge

15　understanding of the ramifications of the problem to be searched. Since Web searching involves a continuous sequence of decisions as to which of several hyperlink threads to pursue. The value of the search is dependent on which of the many hyperlink threads is pursued. Thus,

20　conventionally, when the high level professional requests a search, the results are usually a list of the Web documents or the URL's (Uniform Resource Locations) of the documents that the searcher has selected based upon the hyperlink threads that the searcher has selected.

25　There is insufficient information as to which hyperlink threads the searcher has chosen to ignore or discard.

The physically impaired user is also subject to these Web search limitations, but, in addition, he still has the problems involved in navigating to his documents

30　of choice in the search lists or in navigating to the appropriate URLs.

## Summary of the Present Invention

The present invention is directed to easing the above-described problems of both the professionals/ executives and the physically impaired, as well as any

5   others who have Web browsing or search sessions conducted on their behalf on the Web.  (The terms Web and Internet are used interchangeably in this specification.)  The invention involves the generation of a surrogate Web browsing session at a Web receiving display station by a

10  user who does the basic browsing or searching for a principal user, e.g. the physically limited individual or the executive/professional ordering the browsing session. The implementation comprises means enabling a user to interactively navigate the Web through a sequence of

15  linked hypertext documents in a browsing session at a receiving display station in combination with means for recording on a real-time basis said interactive navigation of said user in said browsing session.  Then there are means enabling a subsequent user to follow the

20  path of said recorded navigation on a real-time basis in a surrogate browsing session on a display device, in combination with means enabling such subsequent user following said path of said recorded navigation in said surrogate session to modulate the real-time of said

25  navigation on said display device.  In other words, the exact Web browsing recorded keystroke by keystroke and mouse point and click by point and click, page by page and selected hyperlink by selected hyperlink is subsequently played back by the principal user on a real-

30  time basis in the surrogate browser session so that the principal user sees exactly what the browsing user or searcher saw.

An important aspect of the invention is that the subsequent principal user is enabled to modulate the real-time of the playback. This is important to the professional/executive type of user in that he has an

5 opportunity to review not only the search results but the actual search process, i.e. did the searcher conduct the search in the best way possible? For example, the principal, based upon his background knowledge, may wish to skim through certain Web pages of little interest even

10 though the search proceeded through such pages slowly and tediously on the real-time basis. On the other hand, the professional principal may recognize as significant a Web page that the searcher skipped through. The principal is enabled to proceed more slowly or quickly through the

15 real-time recorded Web pages during the surrogate session playback. In addition, the principal may recognize that the searcher because of his limited background failed to pursue a browsing or search thread through a particular hyperlink while pursuing a less consequential thread

20 through another hyperlink in a Web page. The ability to slow down the real-time in the surrogate session permits the principal more time to decide that certain search threads should have been taken while others should have been ignored. This may be corrected ordering

25 supplementary Web browsing/searching or possibly by pursuing hyperlinks already saved during the basic browsing session, as will be subsequently described in greater detail.

With respect to the physically impaired user, the

30 real-time recorded session dramatically reduces the number of awkward point and click or keystroke movements required of him. Actually, he only needs to do any pointing should he desire search modifications. The

ability to slow down the real-time of the surrogate
playback session permits more time for the manually or
visually impaired to make and implement their decisions.

The real-time recorded user movements of course
5   include Web page scrolling and selection of particular
hyperlinks on a Web page to access other linked
documents.  The invention includes the provision of
displayed time lines in the recorded and surrogate
browsing sessions.  The user is enabled to insert time
10  marks at points in these time lines to indicate
significant points in the browsing sessions which the
subsequent user may jump back to as needed during the
surrogate browsing session.  The surrogate browsing
session may be carried out off-line from the Web network.
15  Conventional Web browser programs may be modified to
carry out the present invention.  The surrogate Web
browsing sessions may be stored in display computer
storage and memory and then played back on such computer
displays.  The surrogate session may be stored on CD's
20  and played back on display computers.  The surrogate Web
browsing session may also be recorded on video tape or
Cd's and played back on video tape players or CD players.

Brief Description of the Drawings

The present invention will be better understood and
25  its numerous objects and advantages will become more
apparent to those skilled in the art by reference to the
following drawings, in conjunction with the accompanying
specification, in which:

Fig. 1 is a block diagram of a data processing
30  system including a central processing unit and network
connections via a communications adapter that is capable
of functioning as a user interactive Web station for

receiving Web documents in order to record and create the surrogate Web browsing session of this invention;

Fig. 2 is a generalized diagrammatic view of a Web portion showing how the Web may be accessed to and from

5  the Web stations through browser applications for the requesting of Web pages in order to create the surrogate Web browsing sessions of the invention;

Fig. 3 is a diagrammatic view of a Web page displayed through a browser at a receiving display

10  station set up to illustrate the initial page in a Web browser session that is being recorded real-time in accordance with the present invention with a running time line that is shown on the display being recorded and will be shown when the recorded Browsing session is replayed

15  as a surrogate browser session;

Fig. 4 is the diagrammatic display view of Fig. 3 illustrating a subsequent point in the Web page that results from scrolling;

Fig. 5 is the diagrammatic display view of Fig. 3

20  illustrating a subsequent point in the Web page at which a hyperlink to a linked document is selected;

Fig. 6 is a diagrammatic view of the displayed linked Web page resulting from the selection of the hyperlink selected in Fig. 5;

25  Fig. 7 is the diagrammatic display view of Fig. 6 illustrating a subsequent point in the Web page that results from scrolling;

Fig. 8 is the diagrammatic display view of Fig. 6 illustrating a subsequent point in the Web page at which

30  a hyperlink to a linked document is selected;

Fig. 9 is a diagrammatic view of the displayed linked Web page resulting from the selection of the hyperlink selected in Fig. 8;

Fig. 10 is the diagrammatic display view of Fig. 9 illustrating a subsequent point in the Web page at which a hyperlink selected for a later look, delay for subsequent consideration;

5      Fig. 11 is the diagrammatic display view of Fig. 7 illustrating a point in the Web page at which a hyperlink selected for a later look, delay for subsequent consideration;

Fig. 12 is the diagrammatic display view of Fig. 3

10     illustrating a point in the Web page that results from scrolling, and at which the user is enabled to time mark a significant point in the browsing session;

Fig. 13 is a diagrammatic illustration a Look-at-Link-Later Log and a Time Mark Log that may be used in

15     the present invention;

Fig. 14 is an illustrative flowchart describing the setting up of the process needed in the Web browser for enabling a user to provide a surrogate Web browsing session;

20     Fig. 15 is a flowchart of an illustrative run of a process for recording a Web browsing session on a real-time basis; and

Fig. 16 is a flowchart of an illustrative run of a process enabling a user to subsequently view Web browsing

25     sessions recorded in Fig. 15 as a surrogate Web browsing session.


Detailed Description of the Preferred Embodiment

Referring to Fig. 1, a typical data processing terminal is shown which may function as the computer

30     controlled network terminals i.e. Web display stations used for receiving Web pages and for recording on a real-time basis the user Web navigation so as to generate the

corresponding real-time surrogate Web browsing sessions according to the present invention. A central processing unit (CPU) 10, such as one of the PC microprocessors or workstations, e.g. eServer pSeries available from

5    International Business Machines Corporation (IBM), or Dell PC microprocessors, is provided and interconnected to various other components by system bus 12. An operating system 41 runs on CPU 10, provides control and is used to coordinate the function of the various

10   components of Fig. 1. Operating system 41 may be one of the commercially available operating systems such as IBM's AIX 6000™ operating system or Microsoft's WindowsMe™ or Windows 2000™,, as well as UNIX and other IBM AIX operating systems. Application programs 40,

15   controlled by the system, are moved into and out of the main memory Random Access Memory (RAM) 14. These programs include the program of the present invention for recording on a real-time basis the user Web navigation so as to generate the corresponding real-time surrogate Web

20   browsing sessions which will be described hereinafter in combination with any conventional Web browser at the receiving Web station, such as Netscape 3.0™ or Microsoft's Internet Explorer™. A Read Only Memory (ROM) 16 is connected to CPU 10 via bus 12 and includes the

25   Basic Input/Output System (BIOS) that controls the basic computer functions. RAM 14, I/O adapter 18 and communications adapter 34 are also interconnected to system bus 12. I/O adapter 18 may be a Small Computer System Interface (SCSI) adapter that communicates with

30   the disk storage device 20. Communications adapter 34 interconnects bus 12 with an outside Internet or Web network. I/O devices are also connected to system bus 12 via user interface adapter 22 and display adapter 36.

Keyboard 24 and mouse 26 are all interconnected to bus 12 through user interface adapter 22. It is through such input devices that the user may interactively relate to the programs for generating surrogate Web browsing

5    sessions according to the present invention.

Display adapter 36 includes a frame buffer 39, which is a storage device that holds a representation of each pixel on the display screen 38. Images may be stored in frame buffer 39 for display on monitor 38 through various

10   components, such as a digital to analog converter (not shown) and the like. By using the aforementioned I/O devices, a user is capable of inputting information to the system through the keyboard 24 or mouse 26 and receiving output information from the system via display

15   38.

The real-time recording of the navigation during a Web browsing session, hereinafter be described in greater detail, may be stored on the Web station computer itself in Fig. 1 in storage device 20, and moved into RAM 14 in

20   segments to be displayed on display 38 as it is played back during the surrogate browsing sessions. It may also be recorded on either CD recorder player 13 or VCR recorder player 15 which are connected to the system via an appropriate I/O adapter 18. The recorded sessions on

25   either VCR 15 or CD recorder 13 may subsequently be played back through the terminal system on display 38 or on the playback facilities of either CD 13 or VCR 15 through an independent off-line display device.

Before going further into the details of specific

30   embodiments, it will be helpful to understand from a more general perspective the various elements and methods that may be related to the present invention. Since a major aspect of the present invention is directed to documents,

such as Web pages, transmitted over networks such as the Web, an understanding of such networks and their operating principles would be helpful.  We will not go into great detail in describing the networks to which the

5   present invention is applicable.  Reference has also been made to the applicability of the present invention to a global network such as the Internet or Web.  For details on Internet nodes, objects and links, reference is made to the text, <u>Mastering the Internet</u>, G. H. Cady et al.,

10   published by Sybex Inc., Alameda, CA, 1996.

The Internet or Web is a global network of a heterogeneous mix of computer technologies and operating systems.  Higher level objects are linked to the lower level objects in the hierarchy through a variety of

15   network server computers.  These network servers are the key to network distribution, such as the distribution of Web pages and related documentation.  In this connection, the term "documents" is used to describe data transmitted over the Web or other networks and is intended to include

20   Web pages with displayable text, graphics and other images.  This displayable information may be still, in motion or animated, e.g. animated GIF images.

Web documents are conventionally implemented in HTML language, which is described in detail in the text

25   entitled <u>Just Java</u>, van der Linden, 1997, SunSoft Press, particularly at Chapter 7, pp. 249-268, dealing with the handling of Web pages; and also in the above-referenced <u>Mastering the Internet</u>, particularly at pp. 637-642, on HTML in the formation of Web pages.  The images on the

30   Web pages are implemented in a variety of image or graphic files such MPEG, JPEG or GIF files, which are described in the text, <u>Internet:  The Complete Reference,</u>

Millenium Edition, Young et al., 1999, Osborne/McGraw-Hill, particularly at pp. 728-730.

    In addition, aspects of this invention will involve Web browsers. A general and comprehensive description of

5   browsers may be found in the above-mentioned Mastering the Internet text at pp. 291-313. More detailed browser descriptions may be found in the above-mentioned Internet: The Complete Reference, Millennium Edition text: Chapter 19, pp. 419-454, on the Netscape

10  Navigator; Chapter 20, pp. 455-494, on the Microsoft Internet Explorer; and Chapter 21, pp. 495-512, covering Lynx, Opera and other browsers.

    Aspects of the present invention will hereinafter be illustrated through the use of object oriented

15  programming embodiments, particularly the Java program. The following background should be of help. The computer and communications industries have been extensively participating in the development and continual upgrading of object oriented programming systems, such as the Java

20  system. For details and background with respect to object oriented programming systems, such as the Java programming system, C++ and others, reference may be made to some typical texts: Just Java, 2nd Edition, Peter van der Linden, Sun Microsystems, 1997; and Thinking in Java,

25  Bruce Eckel, Prentice Hall PTR, 1998. The functions to be described may be especially effectively implemented using Java$^{(TM)}$ 1.2 or Java Swing. Java 1.2 is detailed and covered in the text Java Swing, Robert Eckstein et al., published by O'Reilly and Associates, California 1998.

30    A generalized diagram of a portion of the Web, which the computer controlled display terminal 57 used for Web page receiving during searching or browsing, is connected as shown in Fig. 2. Computer display terminal 57 may be

implemented by the computer system setup in Fig. 1 and
connection 58 (Fig. 2) is the network connection shown in
Fig. 1. For purposes of the present embodiment, computer
57 serves as a Web display station and has received

5      displayed Web page 56, which is one of a sequence of Web
pages containing hyperlinks to other Web pages or
documents. The computer 57 under the control of the Web
browser program 59 supported by browser cache 49 will
navigate through the Web as will hereinafter be

10     described, and will record and track the navigation real-
time to generate the surrogate Web browsing session.

Reference may be made to the above-mentioned
Mastering the Internet, pp. 136-147, for typical
connections between local display stations to the Web via

15     network servers, any of which may be used to implement
the system on which this invention is used. The system
embodiment of Fig. 2 has a host-dial connection. Such
host-dial connections have been in use for over 30 years
through network access servers 53 that are linked 61 to

20     the Web 50. The Web servers 53, which also may have the
computer structure described with respect to Fig. 1, may
be maintained by an Internet Service Provider (ISP) to
the client's display terminal 57. The Web server 53 is
accessed by the client terminal 57 through a normal dial-

25     up telephone linkage 58 via modem 54, telephone line 55
and modem 52. The HTML file representative of the Web
page 56 has been downloaded to display terminal 57
through Web access server 53 via the telephone line
linkages from server 53, which may have accessed them

30     from the Web 50 via linkage 61. The Web browser program
59 operates within the display terminals 57 to control
the communication with the Web access server 53 to
thereby download and display the accessed Web pages 56 on

terminal 57.  The Web access server 53 uses one of the
previously described search engines 51 to access via the
Web 50 the desired sequence of Web pages from appropriate
Web resources such as databases 60 and 62.  Web browser

5    59 will carry out the functions of recording the real-
time navigation so that the recorded navigation will be
available for the surrogate browsing sessions that are,
preferably, conducted off-line with respect to the Web.

     Now, with respect to Figs. 3 and 12, we will provide

10   an illustrative example of how the present invention may
be used for the creation of surrogate Web browsing
sessions by the real-time recording of all navigation
steps followed by the user in navigating through the Web.
As the first step in the recorded navigation, Web page

15   64, Fig. 3, is an illustration of the displayed Web page
56 in Fig. 2.  This standard page may contain text,
graphics and images, as well as hyperlinks 63 to other
Web documents.  Also in the title/menu bar, there are a
pair of buttons:  "M", 60 to time mark the document along

20   the running time line 61.  The time marking of points in
the recorded Web browser session will be subsequently
described in greater detail.  There is also an "L" (Look-
at-Link-Later) button 62 that the user may click on to
put the Web page into the mode described in the above-

25   mentioned copending Cross-Referenced application, wherein
the user is enabled to select hyperlinks for later or
delayed viewing of the documents linked to such selected
hyperlinks.

     At the outset of this description of the diagrams 3

30   through 12, it should be noted that the continuous
capturing of all of the scrolling driven through scroll
bars 66, as well as the mouse and/or keystrokes in
navigating through the hyperlinks in the Web pages are

implemented on a real-time basis by the <u>Java Virtual
Machine</u>.  The basic functions of the <u>Java Virtual Machine</u>
and its relations to objects therein and to the computer
operating system, such as operating system 41, is

5    described in detail at pp. 455-461 of the text <u>Java Jump
Start</u>, Noel Enete, published by Prentice Hall, New
Jersey, 1997.  The developer-user through an input device
such as mouse 26 through operating system 41, Fig. 1
interactively interfacing with application program 40.

10   Display interface requirements are provided by the
graphics engine of operating system 41, e.g. the
graphics/text functions of Windows 2000™, which in turn
translates the screen-by-screen dynamic pixel array
layouts provided by the application 52 in <u>Java Virtual</u>

15   <u>Machine</u> 54 for the interactive developer/user layouts.
These pixel arrays are provided through display adapter
36 to frame buffer 39 which maintains the user
interactive pixel array panels on display 38.

In the same recording of the navigation on a real-

20   time basis, in a continuous flow, use is made of the
dynamic function of the Java program to establish a
repetitive pattern in which the screen gets automatically
repainted every fractional second time interval to thus
create a sense of user movement, not unlike that in

25   simple animation.  The continuous movement of the time
line or tracked changes in the time are similarly
dynamically captured.  This Java routine for dynamic
continuous screen capturing is described in detail in the
above referenced text, <u>Java Jump Start</u>, Chapter 8 at pp.

30   89-103.

Insofar as providing a time line or, even more
conveniently, a running clock label for the same purpose
as illustrated commencing with Fig. 7, <u>Java Swing</u> or <u>Java</u>

1.2, conveniently provides a Timer Class as described in
the above-mentioned text _Java Swing_, Robert Eckstein et
al.

    With this background relative to the implementation
5  of the real-time recording of navigation in a Web
browsing session, the scrolling of Web page 64 from Fig.
3 to Fig. 4 is recorded along with time line 61, as is
the further scrolling from the Web page of Fig. 4 to a
point in Fig. 5 where the user, via pointer 70, clicks on
10  hyperlink 65 causing the navigation to jump to the linked
Web page shown in Fig. 6, "Gulf War Illnesses". The jump
is, of course, recorded real-time as indicated along time
line 61. The recorded scrolling continues in the "Gulf
War Illness" Web page as shown in Fig. 7. The recording
15  of time line continues but just for convenience in
illustration, the line 61 is replaced by a changing time
label 69 that continues to track the time. As shown in
Fig. 8, the recorded scrolling in the linked Web page
continues until a further hyperlink 68 is selected
20  through pointer 70 which in turn brings up a subsequent
linked Web page, "Al Jaber Air Base", as illustrated in
Fig. 9. As the recorded scrolling in the Al Jaber Air
Base Web page continues, Fig. 10, a link 71 is selected
but not for immediate viewing. Link 71 is to be stored
25  in accordance with the process of the above Cross-
Referenced application for later possible viewing of its
linked document. This is done by clicking on button 60
which results in the display of "L" point 72. By
pointing and clicking on hyperlink 71, this hyperlink is
30  stored as item 76 in the "Look-at-Link-Later Log" 75
shown in Fig. 13 in accordance with the process of the
Cross-Referenced application. The scrolling, as recorded
real-time, then backs up again in the "Gulf War Illness"

Web page as shown in Fig. 11 where hyperlink 67 is
similarly selected for later viewing and thereby becomes
item 77 in Log 75 of Fig. 13.

5         As previously mentioned, the invention also provides
for time marking of time points in the recorded Web
navigation during a browsing session in order to bring
significant points in the subsequent surrogate browsing
session to the attention of the user.  With reference to
Fig. 11, to time mark, the user simply clicks on button
10    62 "M" which stores the time on the time line at the time
of the selection as a time mark 79 in Time Log 78 shown
in Fig. 13.

         Since the basic Web browsing session has been
recorded on a real-time basis, the subsequent surrogate
15    browsing will be played back substantially with the same
image sequence.  Fig. 12 is an example of a typical
display screen in a surrogate or real-time playback mode.
If time marks have been stored, then this may be brought
to the user's attention by the display of a time mark
20    button 73 that the user may click on in order to display
a Time Mark Log, e.g. Log 73 of Fig. 13.  The user may
then click on any of the marks in the log, and jump the
surrogate session to that real-time point in the
sequence.  Optionally, the time mark 79 may also include
25    a textual identifier to indicate the nature of the
content at that time mark.  Also, in the surrogate mode,
the user may click on "L" button 60 to bring up the Look-
at-Link-Later Log 75 of Fig. 13.

         In the surrogate or playback mode shown in Fig. 12,
30    the user may modulate the playing speed of the real-time
surrogate browsing though interactive <Slow---Fast> gauge
80 to suit the browsing needs of the surrogate user.
With such modulation of playback speed, the Java program

for repainting screens described above may be
correspondingly adjusted to vary the intervals between
the repainting of the screen to accommodate such
modulation.  If the surrogate session is stored on a tape

5   cassette player, like the Sony Beta-Cam, it has a built-
in capability of varying the tape playback speed in
response to user input.

    Fig. 14 is a flowchart showing the development of a
process according to the present invention for recording

10  a Web browsing session on a real-time basis for
subsequent real-time playback in a surrogate browsing
session.  There is provided at a receiving display
station, a Web browser for accessing Web pages or
documents and for displaying the same, step 83.  Web

15  browsers also provide for the accessing of Web pages and
other documents hyperlinked to displayed Web pages, step
84.  There is provided a browser routine for real-time
recording of a Web browsing sessions during which the
user interactively navigates through a sequence of linked

20  Web pages at a receiving display station, step 85.  There
is provided a playback implementation enabling the user
to follow the path of the recorded navigation in real-
time on a display device in a surrogate browsing session,
step 86.  An implementation is provided whereby a user

25  may modulate the real-time of the recorded navigation
during the surrogate browsing session, step 87.  A
browser routine is provided for maintaining a Real-Time
Log of the recorded navigation path and for displaying
the times of the navigation in the surrogate session,

30  step 88.  A routine is provided enabling the user to
insert time marks in the time line to mark significant
points in the browsing session, step 89.  Lastly, an
implementation is provided so that the subsequent user or

principal who ordered the Web browsing session may follow the surrogate browsing session off-line, e.g. on a computer controlled display or videotape display, step 90.

5      The running of the process set up in Fig. 14 will now be described with respect to the flowchart of Figs. 15 and 16. Let us assume that we are in a Web browsing session through the browser that we are to record on a real-time basis. The flowchart of Fig. 15 represents
10     some illustrative steps in such a recording routine. The browser, via a Web server, accesses the pages found by a search engine, step 92; thus, the next Web page is accessed. The real-time recording has commenced, step 93, and the real-time is continuously displayed, either
15     as a line or as a changing time label, step 94. As the recorded browsing session progresses, a determination is made as to whether the user has selected a hyperlink in a displayed Web page, step 95. If Yes, the browser gets the linked page, step 96, and displays it; while, step
20     97, the continuous real-time session is displayed. At this point, or if the decision at step 95 is No, a hyperlink has not been selected, then, step 98, a determination may conveniently be made as to whether the session is over. If Yes, the session is exited. If No,
25     then at step 99, a further determination is made as to whether the user has selected a next Web page. If Yes, the next selected Web page is retrieved and displayed, step 100. If No, the session returns to step 95 where the selection of the next hyperlink is awaited. After
30     step 100, a determination is made, step 101, as to whether the user has chosen to select a hyperlink to be stored in Look-at-Link-Later Log of Fig. 13. If Yes, the link is stored in this log, step 102. Then, or if the

decision from step 101 is No, a determination is made as to whether the browser made a time mark on the time line at this point, step 103. If Yes, then, step 104, the time mark is indicated on the display and stored in the

5    Time Mark Log of Fig. 13. Then, or if the decision from step 103 is No, the process proceeds via branch "A" to step 95 where the selection of the next hyperlink is awaited.

Now, with respect to the flowchart of Fig. 16, an

10   illustration of the recorded surrogate browser session will be described. The run of the recorded Web browser session is commenced, step 110. A determination is made as to whether the playback in the surrogate session is too fast, step 111. If Yes, the playback speed is

15   reduced, step 112. Then, or if the decision in step 111 is No, a further determination is made as to whether the playback in the surrogate session is too slow, step 113. If Yes, the playback speed is increased, step 114. Then, or if the decision in step 113 is No, a determination is

20   made, step 115, as to whether the user has selected a time mark from the Time Mark Log. If Yes, the surrogate session jumps to the session point of the time mark, step 116. Then, or if the decision in step 115 is No, a determination is made, step 117, as to whether the user

25   has selected a stored link from the Look-at-Link-Later Log of Fig. 13. If Yes, then the real-time playback of the surrogate session is stopped, step 119, and the selected Look-at-Link-Later Web page is retrieved and reviewed, step 120. A determination is made, step 121,

30   as to whether the user has completed reviewing the Web page retrieved in step 120. If No, this completion is awaited. If Yes, then the process is branched back via branch "B" to step 110 where the run of the recorded Web

browser session is recommenced. On the other hand, if
the decision back at step 117 is No, a determination may
conveniently be made at this point as to whether the
session is at an end, step 118. If Yes, the session is
5    ended. If No, then the process is branched back via
branch "C" to step 110 where the run of the recorded Web
browser session is continued.

One of the preferred implementations of the present
invention is in application program 40, i.e. a browser
10   program made up of programming steps or instructions
resident in RAM 14, Fig. 1, of a Web receiving station
and/or Web server during various Web operations. Until
required by the computer system, the program instructions
may be stored in another readable medium, e.g. in disk
15   drive 20, or in a removable memory, such as an optical
disk for use in a CD ROM computer input or in a floppy
disk for use in a floppy disk drive computer input.
Further, the program instructions may be stored in the
memory of another computer prior to use in the system of
20   the present invention and transmitted over a Local Area
Network (LAN) or a Wide Area Network (WAN), such as the
Web itself, when required by the user of the present
invention. One skilled in the art should appreciate that
the processes controlling the present invention are
25   capable of being distributed in the form of computer
readable media of a variety of forms.

Although certain preferred embodiments have been
shown and described, it will be understood that many
changes and modifications may be made therein without
30   departing from the scope and intent of the appended
claims.